

## High Performance Marine Diesel Closed Coolant System for High Speed Combatant Craft

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### Description:

**OBJECTIVE:** Develop a closed coolant system for the SOC-R to eliminate use of off-board, raw water to cool the engines. **DESCRIPTION:** SOC-R engine cooling is provided by raw water from the engine pumps and from the Hamilton jets. This raw water sometimes contains debris that clogs the engine strainers causing the engines to overheat. This is especially problematic during beaching operations when personnel transfer to and from the craft. What is needed is a closed coolant system to cool the engines without using raw seawater, thereby eliminating the need for existing strainers that sometimes clog with seaweed and other debris. The cooler shall not degrade the current capabilities of the SOC-R, such as reducing speed due to increased drag of the cooler or cavitations to the propulsion system. The cooler must be capable of surviving beaching/ grounding at low speeds without structural damage and at high speeds without major damage or loss of watertight integrity. **PHASE I:** Conduct a feasibility study for the development of a conformal, recessed cooling system to provide engine cooling. The cooler shall not degrade the current capabilities of the SOC-R. The cooler must be capable of surviving beaching and grounding at low speeds without structural damage and at high speeds without major damage or loss of watertight integrity. The cooler must not exceed 75 lbs. The feasibility study shall include a design of the cooler. The objective of this USSOCOM Phase I SBIR effort is to conduct and document the results of a thorough feasibility study to investigate what is in the art of the possible within the given trade space that will satisfy a needed technology. The feasibility study should investigate all known options that meet or exceed the minimum performance parameters specified in this write up. It should also address the risks and potential payoffs of the

innovative technology options that are investigated and recommend the option that best achieves the objective of this technology pursuit. The funds obligated on the resulting Phase I SBIR contracts are to be used for the sole purpose of conducting a thorough feasibility study using scientific experiments and laboratory studies as necessary. Operational prototypes will not be developed with USSOCOM SBIR funds during Phase I feasibility studies. Operational prototypes developed with other than SBIR funds that are provided at the end of Phase I feasibility studies will not be considered in deciding what firm(s) will be selected for Phase II. PHASE II: Using the design developed in Phase I, build a prototype of the cooler and install in Naval Special Warfare's SOC-R test craft for evaluation. The test craft with cooler shall be demonstrated in operational conditions in the littoral (rolling sea) and riverine environments. The cooler(s) must demonstrate the capability to outperform exiting strainer systems in keeping the engines within normal operating temperatures. The cooler must be capable of surviving beaching and grounding at low speeds without structural damage and at high speeds without major damage or loss of watertight integrity. The cooler must not exceed 75 lbs. PHASE III DUAL-USE APPLICATIONS: Application for a cooler for high speed combatant craft includes the 11M NSW RIB and other Navy high speed craft that operate in riverine environments. Potential application for the Department of Homeland Security/United States Coast Guard high speed water craft.